

**Barnstable County Retirement System**

*Actuarial Valuation and Review  
as of January 1, 2004*

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The Segal Company  
116 Huntington Ave., 8th Floor Boston, MA 02116  
T 617.424.7300 F 617.424.7390 www.segalco.com

*May 19, 2004*

*Retirement Board  
Barnstable County Retirement System  
99 Willow Street  
Yarmouthport, MA 02675-1742*

*Dear Board Members:*

*We are pleased to submit this Actuarial Valuation and Review as of January 1, 2004. It summarizes the actuarial data used in the valuation, establishes the funding requirements for fiscal 2005 and later years and analyzes the preceding two years' experience.*

*The census and financial information on which our calculations were based were prepared by the Barnstable County Retirement System. That assistance is gratefully acknowledged. The actuarial calculations were completed under my supervision.*

*This actuarial valuation has been completed in accordance with generally accepted actuarial principles and practices. To the best of our knowledge, the information supplied in this actuarial valuation is complete and accurate. Further, in our opinion, the assumptions as approved by the Board are reasonably related to the experience of and the expectations for the Plan.*

*We look forward to reviewing this report at your next meeting and to answering any questions.*

*Sincerely,*

*THE SEGAL COMPANY*

*By:*

*Kathleen A. Riley, FSA, MAAA, EA  
Senior Vice President and Actuary*

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## **SECTION 1: Valuation Summary for the Barnstable County Retirement System**

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### **Purpose**

This report has been prepared by The Segal Company to present a valuation of the Barnstable County Retirement System as of January 1, 2004. The valuation was performed to determine whether the assets and contributions are sufficient to provide the prescribed benefits. The contribution requirements presented in this report are based on:

- The benefit provisions of M.G.L. Chapter 32;
- The characteristics of covered active participants, inactive vested participants, and retired participants and beneficiaries as of January 1, 2004;
- The assets of the Plan as of December 31, 2003;
- Economic assumptions regarding future salary increases and investment earnings; and
- Other actuarial assumptions, regarding employee terminations, retirement, death, etc.

### **Significant Issues in Valuation Year**

The following key findings were the result of this actuarial valuation:

- The actuarial valuation report as of January 1, 2004 is based on financial information as of that date. Changes in the value of assets subsequent to that date are not reflected.
- During the plan years ended 2002 and 2003, the market value rate of return was (10.16)% and 22.15%, respectively. Because the actuarial value of assets gradually recognizes market value fluctuations over a five-year period, the actuarial rates of return for the plan years ended 2002 and 2003 were (6.73)% and 7.02%, respectively. The actuarial value of assets as of December 31, 2003 was \$378.3 million, or 104.74% of the market value of assets.
- The fiscal 2005 appropriation was set at the previously budgeted amount of \$27,628,099 plus the payment on the 2003 ERI of \$154,964 for a total of \$27,783,063. The fiscal year 2006 appropriation increases to \$30,224,666.
- The unfunded liability has increased from \$190.6 million as of January 1, 2002 to \$269.3 million as of January 1, 2004. The increase is primarily due to an investment loss of \$63.5 million and the additional liability of \$9.1 million associated with the 2002 and 2003 ERIs.

## SECTION 1: Valuation Summary for the Barnstable County Retirement System

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- As indicated in Section 2, Subsection B of this report, the total unrecognized investment loss as of December 31, 2003 is \$17.1 million. This investment loss will be recognized in the determination of the actuarial value of assets for funding purposes in the next few years, to the extent it is not offset by recognition of investment gains derived from future experience. This implies that earning the assumed rate of investment return of 8.25% per year (net of expenses) on a **market value** basis will result in investment losses on the actuarial value of assets in the next few years. Therefore, if the actual market return is equal to the assumed 8.25% rate and all other actuarial assumptions are met, the contribution requirements would still increase in each of the next few years.

## SECTION 1: Valuation Summary for the Barnstable County Retirement System

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### Summary of Key Valuation Results

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	January 1, 2004	January 1, 2002
<b>Contributions:</b>		
Recommended for fiscal 2005 and 2003	\$27,783,063	\$21,212,200
Recommended for fiscal 2006 and 2004	30,224,666	24,449,645
<b>Funding Elements:</b>		
Normal cost, including administrative expenses	\$26,962,136	\$24,571,264
Market value of assets	361,191,642	313,202,450
Actuarial value of assets	378,317,300	362,911,896
Actuarial accrued liability	647,655,411	553,531,966
Unfunded actuarial accrued liability	269,338,111	190,620,070
<b>GASB 25/27:</b>		
Annual required contributions	\$27,783,063	\$21,212,200
Actual contributions	--	21,212,200
Percentage contributed	--	100.00%
Funded ratio	58.41%	65.56%
<b>Demographic Data:</b>		
Number of retired participants and beneficiaries	2,125	1,952
Number of inactive participants	834	899
Number of active participants	5,031	4,970
Total payroll	\$181,849,453	\$166,134,511
Average payroll	36,146	33,427

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## SECTION 2: Valuation Results for the Barnstable County Retirement System

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### A. PARTICIPANT DATA

The Actuarial Valuation and Review considers the number and demographic characteristics of covered participants, including active participants, inactive participants, retired participants and beneficiaries.

This section presents a summary of significant statistical data on these participant groups.

More detailed information for this valuation year and the preceding valuation can be found in Section 3, Exhibits A and B.

*A historical perspective of how the participant population has changed over the past six valuations can be seen in this chart.*

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#### CHART 1

##### Participant Population: 1993 – 2003

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Year Ended December 31	Active Participants	Inactive Participants	Retired Participants and Beneficiaries
1993	3,784	N/A	1,569
1995	3,970	48	1,642
1997	4,229	501	1,730
1999	4,713	664	1,816
2001	4,970	899	1,952
2003	5,031	834	2,125

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## SECTION 2: Valuation Results for the Barnstable County Retirement System

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### Active Participants

Plan costs are affected by the age, years of service and payroll of active participants. In this year's valuation, there were 5,031 active participants with an average age of 45.5, average years of service of 8.7 years and average payroll of \$36,146. The 4,970 active participants in the prior valuation had an average age of 45.1, average service of 8.5 years and average payroll of \$33,427.

Among the active participants, there were 25 participants with unknown age and/or service information. The actuarial calculations were adjusted for the missing information by assuming that it was the same as information provided for other active participants with similar characteristics.

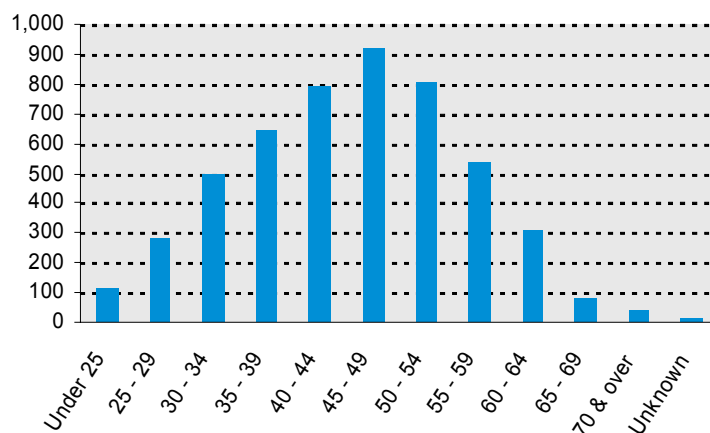
*These graphs show a distribution of active participants by age and by years of service.*

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**CHART 2**

**Distribution of Active Participants by Age as of December 31, 2003**

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### Inactive Participants

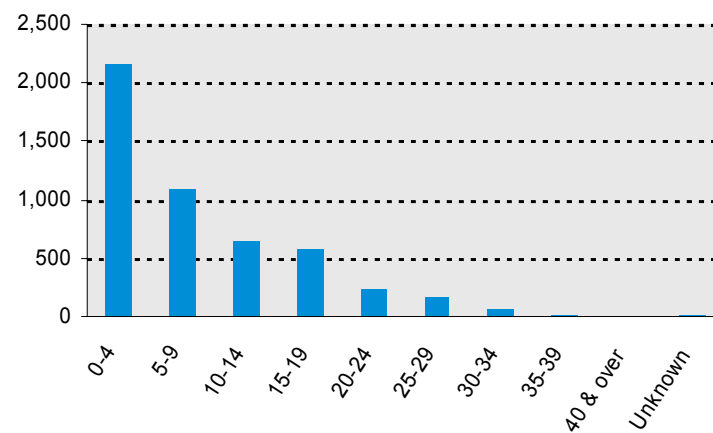
In this year's valuation, there were 834 participants with a vested right to a return of their employee contributions or a deferred or immediate vested benefit.

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**CHART 3**

**Distribution of Active Participants by Years of Service as of December 31, 2003**

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## SECTION 2: Valuation Results for the Barnstable County Retirement System

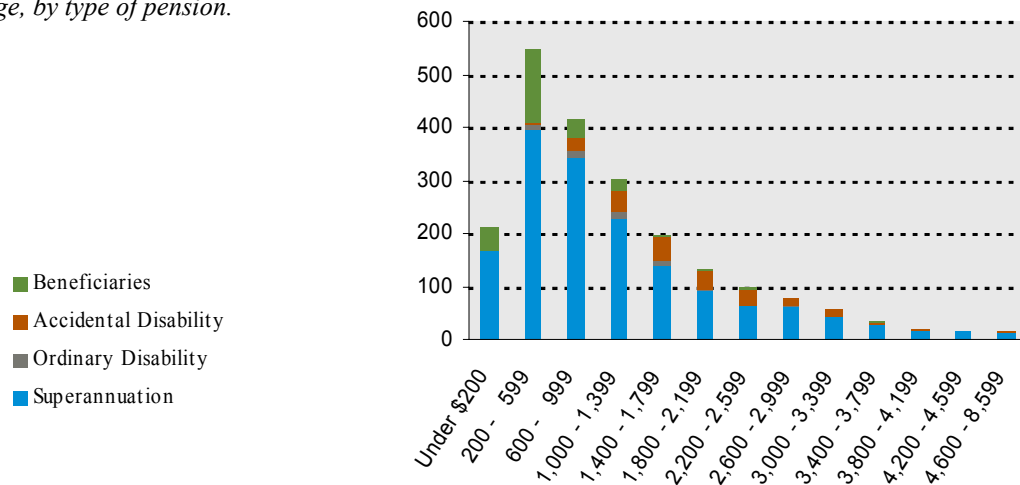
### Retired Participants and Beneficiaries

As of December 31, 2003, 1,867 retired participants and 258 beneficiaries were receiving total monthly benefits of \$2,484,940. For comparison, in the previous valuation, there were 1,693 retired participants and 259 beneficiaries receiving monthly benefits of \$1,923,239.

*These graphs show a distribution of the current retired participants and beneficiaries based on their monthly amount and age, by type of pension.*

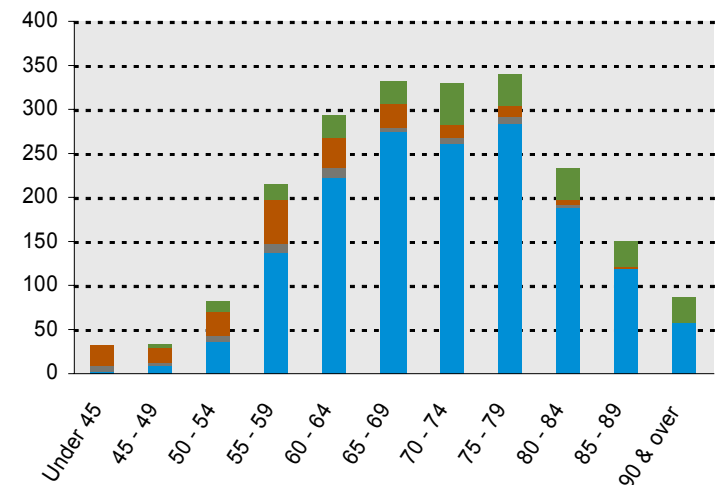
**CHART 4**

**Distribution of Retired Participants and Beneficiaries by Type and by Monthly Amount as of December 31, 2003**



**CHART 5**

**Distribution of Retired Participants and Beneficiaries by Type and by Age as of December 31, 2003**



## SECTION 2: Valuation Results for the Barnstable County Retirement System

### B. FINANCIAL INFORMATION

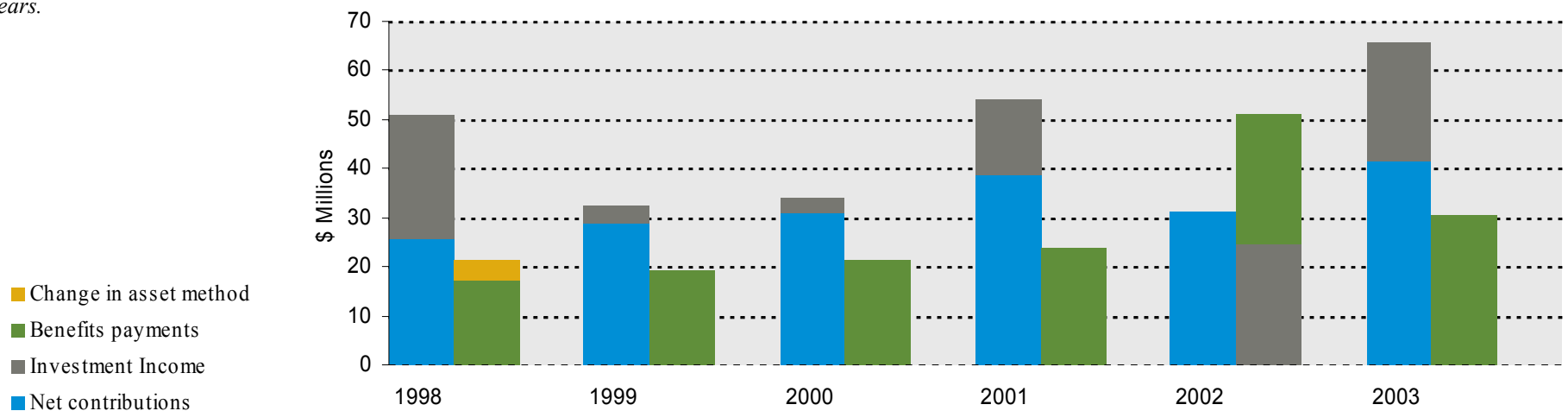
Retirement plan funding anticipates that, over the long term, both net contributions (less administrative expenses) and net investment earnings (less investment fees) will be needed to cover benefit payments.

Retirement plan assets change as a result of the net impact of these income and expense components. Additional financial information, including a summary of these transactions for the valuation year, is presented in Section 3, Exhibits C and D.

*The chart depicts the components of changes in the actuarial value of assets over the last six years.*

**CHART 6**

**Comparison of Increases and Decreases in the Actuarial Value of Assets for Years Ended December 31, 1998 – 2003**



## SECTION 2: Valuation Results for the Barnstable County Retirement System

It is desirable to have level and predictable plan costs from one year to the next. For this reason, the Board has approved an asset valuation method that gradually adjusts to market value. Under this valuation method, the full value of market fluctuations is not recognized in a single year and, as a result, the asset value and the plan costs are more stable.

The amount of the adjustment to recognize market value is treated as income, which may be positive or negative. Realized and unrealized gains and losses are treated equally and, therefore, the sale of assets has no immediate effect on the actuarial value.

*The chart shows the determination of the actuarial value of assets as of the valuation date.*

### CHART 7

#### Determination of Actuarial Value of Assets for Year Ended

	December 31, 2003	December 31, 2002
1. Actuarial value of assets at the beginning of the year	\$343,079,367	\$362,911,896
2. Contributions, less benefit payments and expenses during the year	10,770,995	4,750,922
3. Average actuarial value: (1) + [50% of (2)]	348,464,865	365,287,357
4. Expected investment income: .0825 x (3)	28,748,352	30,136,207
5. Preliminary actuarial value of assets at the end of the year: (1) + (2) + (4)	382,598,714	397,799,025
6. Market value of assets at the end of the year	361,191,642	285,899,472
7. Adjustment toward market value: 20% of [(6) - (5)]	-4,281,414	-22,379,911
8. Adjustment to be within 20% corridor	0	-32,339,747
9. Final actuarial value of assets: (5) + (7) + (8)	<u>\$378,317,300</u>	<u>\$343,079,367</u>
10. Actuarial value as a percentage of market value: (9) ÷ (6)	<u>104.7%</u>	<u>120.0%</u>

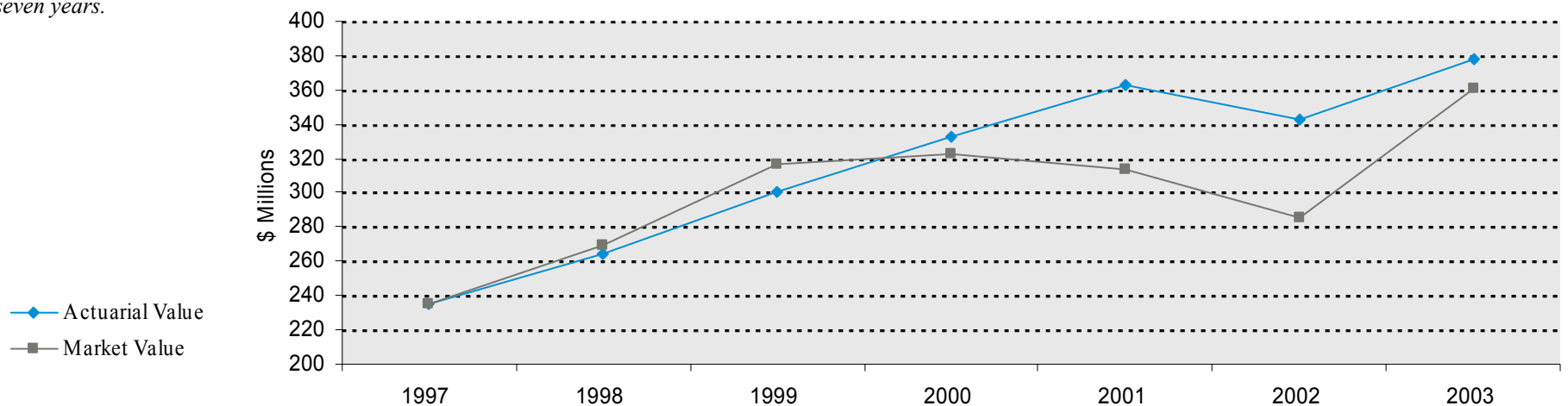
## SECTION 2: Valuation Results for the Barnstable County Retirement System

Both the actuarial value and market value of assets are representations of the Barnstable County Retirement System's financial status. As investment gains and losses are gradually taken into account, the actuarial value of assets tracks the market value of assets. The actuarial asset value is significant because the Barnstable County Retirement System's liabilities are compared to its assets to determine what portion, if any, remains unfunded. Amortization of the unfunded liability is an important element in determining the contribution requirement.

*This chart shows the change in the actuarial value of assets versus the market value over the past seven years.*

**CHART 8**

**Actuarial Value of Assets vs. Market Value of Assets: December 31, 1997 – 2003**



## SECTION 2: Valuation Results for the Barnstable County Retirement System

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### C. ACTUARIAL EXPERIENCE

To calculate the required contribution, assumptions are made about future events that affect the amount and timing of benefits to be paid and assets to be accumulated. Each year actual experience is measured against the assumptions. If overall experience is more favorable than anticipated (an actuarial gain), the contribution requirement will decrease from the previous year. On the other hand, the contribution requirement will increase if overall actuarial experience is less favorable than expected (an actuarial loss).

Taking account of experience gains or losses in one year without making a change in assumptions reflects the belief that the single year's experience was a short-term

development and that, over the long term, experience will return to the original assumptions. For contribution requirements to remain stable, assumptions should approximate experience.

If assumptions are changed, the contribution requirement is adjusted to take into account a change in experience anticipated for all future years.

When compared to the actuarial accrued liability of \$647,655,411 as of December 31, 2003, the net experience variation from sources other than investments was not significant. A discussion of the major components of the actuarial experience is on the following pages.

*This chart provides a summary of the actuarial experience over the past two years.*

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### CHART 9

#### Actuarial Experience for Two-Year Period Ended December 31, 2003

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1. Net loss from investments*	-\$63,515,444
2. Net gain from administrative expenses	257,494
3. Net loss from other experience	<u>-6,700,523</u>
4. Net experience loss: (1) + (2) + (3)	-\$69,958,473

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\* Details in Chart 10

## SECTION 2: Valuation Results for the Barnstable County Retirement System

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### Investment Rate of Return

A major component of projected asset growth is the assumed rate of return. The assumed return should represent the expected long-term rate of return, based on the Barnstable County Retirement System's investment policy. For valuation purposes, the assumed rate of return on the actuarial value of assets is 8.25%. The actual rate of return on an actuarial basis for 2003 and 2002 was 7.02% and (6.73%), respectively.

Since the actual return for each year was less than the assumed return, the Barnstable County Retirement System experienced an actuarial loss during the two-year period ending December 31, 2003 with regard to its investments.

*This chart shows the gain/(loss) due to investment experience.*

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**CHART 10**  
**Investment Experience for Year Ended**

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	December 31,	
	2003	2002
1. Net investment income	\$24,466,937	-\$24,583,451
2. Average actuarial value of assets	348,464,865	365,287,357
3. Rate of return: (1) ÷ (2)	7.02%	-6.73%
4. Assumed rate of return	8.25%	8.25%
5. Expected net investment income: (2) x (4)	\$28,748,351	\$30,136,207
6. Actuarial gain/(loss): (1) – (5)	<u>-\$4,281,414</u>	<u>-\$54,719,658</u>

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## SECTION 2: Valuation Results for the Barnstable County Retirement System

Because actuarial planning is long term, it is useful to see how the assumed investment rate of return has followed actual experience over time. The chart below shows the rate of return on an actuarial basis compared to the market value investment return for the last six years, including a five-year average.

Based upon this experience and future expectations, we have maintained the assumed rate of return of 8.25%.

### CHART 11

#### Investment Return – Actuarial Value vs. Market Value: December 31, 1998 – 2003

Year Ended December 31	Actuarial Value Investment Return		Market Value Investment Return	
	Amount	Percent	Amount	Percent
1998	\$20,857,870	8.71	\$25,259,093	10.55
1999	26,183,189	9.72	37,613,550	13.74
2000	22,811,404	7.48	-2,443,230	-0.76
2001	15,615,391	4.59	-24,671,005	-7.46
2002	-24,583,451	-6.73	-32,053,900	-10.16
2003	<u>24,466,937</u>	7.02	<u>64,521,174</u>	22.15
Total	\$85,351,340		\$68,225,682	
	Five-year average return	3.24%		3.52%

*Note: Each year's yield is weighted by the average asset value in that year.*

## SECTION 2: Valuation Results for the Barnstable County Retirement System

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Subsection B described the actuarial asset valuation method that gradually takes into account fluctuations in the market value rate of return. The effect of this is to stabilize the actuarial rate of return, which contributes to leveling pension plan costs.

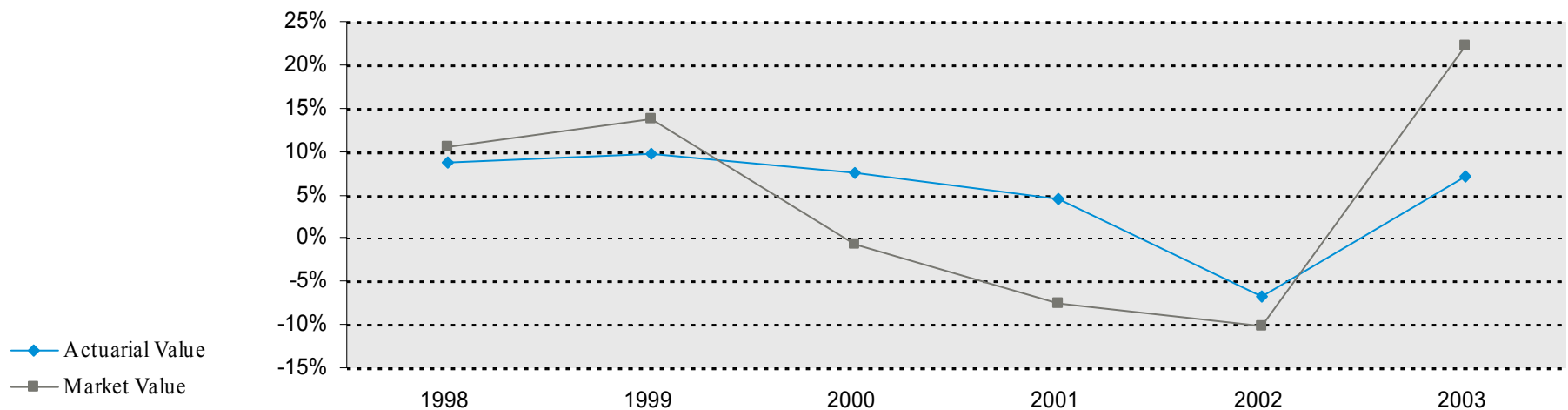
### Administrative Expenses

Administrative expenses for the years ended December 31, 2003 and 2002 were \$626,414 and \$623,022, respectively, compared to the assumption of \$715,300 per year. This resulted in a gain of \$257,494 for the two-year period, including an adjustment for interest. We have maintained the assumption of \$715,300 for calendar year 2004.

*This chart illustrates how this leveling effect has actually worked over the years 1998 - 2003 .*

**CHART 12**

**Market and Actuarial Rates of Return: December 31, 1998 - 2003**





## SECTION 2: Valuation Results for the Barnstable County Retirement System

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### Other Experience

There are other differences between the expected and the actual experience that appear when the new valuation is compared with the projections from the previous valuation. These include:

- the extent of turnover among the participants,
- retirement experience (earlier or later than expected),
- mortality (more or fewer deaths than expected),

- the number of disability retirements, and
- salary increases different than assumed.

The net loss from this other experience for the two-year period ending December 31, 2003 amounted to (\$6,700,523) which is 1.0% of the actuarial accrued liability.

*The chart shows elements of the experience gain/(loss) for the most recent years.*

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### CHART 13

#### Experience from Sources Other than Investments for Two-Year Period Ended December 31, 2003

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1. 2002 ERI	-\$6,593,142
2. 2003 ERI	-2,406,543
3. Net 3(8)(c) reimbursements from other systems	567,573
4. Miscellaneous	<u>1,731,589</u>
5. Total	-\$6,700,523

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## SECTION 2: Valuation Results for the Barnstable County Retirement System

### D. RECOMMENDED CONTRIBUTION

The amount of annual contribution required to fund the Plan is comprised of an employer normal cost payment and a payment on the unfunded actuarial accrued liability.

The recommended contribution is based on a 4-year increasing amortization of the 1992 ERI liability and a 24-year increasing amortization of the 2002 and 2003 ERI liabilities and the remaining unfunded liability.

Amortization payments all increase at 4.50% per year. We have set the fiscal 2005 appropriation to the budgeted amount of \$27,628,099, plus the payment on the 2003 ERI, for a total amount of \$27,783,063. The fiscal 2006 appropriation will be \$30,224,666. Exhibit G in Section 3 shows the recommended contribution through 2028 based on this funding schedule.

*The chart compares this valuation's recommended contribution with the prior valuation.*

### CHART 14 Recommended Contribution

	Year Beginning January 1			
	2004		2002	
	Amount	% of Payroll	Amount	% of Payroll
1. Total normal cost	\$26,246,836	13.77%	\$23,855,964	13.74%
2. Administrative expenses	715,300	0.38%	715,300	0.41%
3. Expected employee contributions	<u>-15,959,037</u>	<u>-8.37%</u>	<u>-14,127,883</u>	<u>-8.14%</u>
4. Employer normal cost: (1) + (2) + (3)	\$11,003,099	5.77%	\$10,443,381	6.02%
5. Actuarial accrued liability	647,655,411		553,531,966	
6. Actuarial value of assets	<u>378,317,300</u>		<u>362,911,896</u>	
7. Unfunded actuarial accrued liability: (5) - (6)	\$269,338,111		\$190,620,070	
8. Employer normal cost projected to July 1, 2004 and 2002, adjusted for timing	11,473,083	5.89%	10,889,458	6.14%
9. Projected unfunded actuarial accrued liability	280,228,152		198,327,335	
10. Payment on projected unfunded actuarial accrued liability, adjusted for timing	17,674,187	9.07%	11,945,619	6.73%
11. Preliminary recommended contribution: (8) + (10)	29,147,270	14.96%	22,835,077	12.87%
12. Budgeted appropriation	<u>\$27,783,063</u>	<u>14.26%</u>	<u>\$21,212,200</u>	<u>11.95%</u>
13. Projected payroll	\$194,855,625		\$177,473,811	

Notes: Amortization payments increase at 4.50% per year.

Recommended contributions are assumed to be paid on July 1 and December 31.

## SECTION 2: Valuation Results for the Barnstable County Retirement System

### E. INFORMATION REQUIRED BY THE GASB

Governmental Accounting Standards Board (GASB) reporting information provides standardized information for comparative purposes of governmental pension plans. This information allows a reader of the financial statements to compare the funding status of one governmental plan to another on relatively equal terms.

Critical information to GASB is the historical comparison of the GASB required contribution to the actual contributions. This comparison demonstrates whether a plan is being funded on an actuarially sound basis and in accordance with the GASB funding requirements. Chart 16 below presents a graphical representation of this information for the Plan.

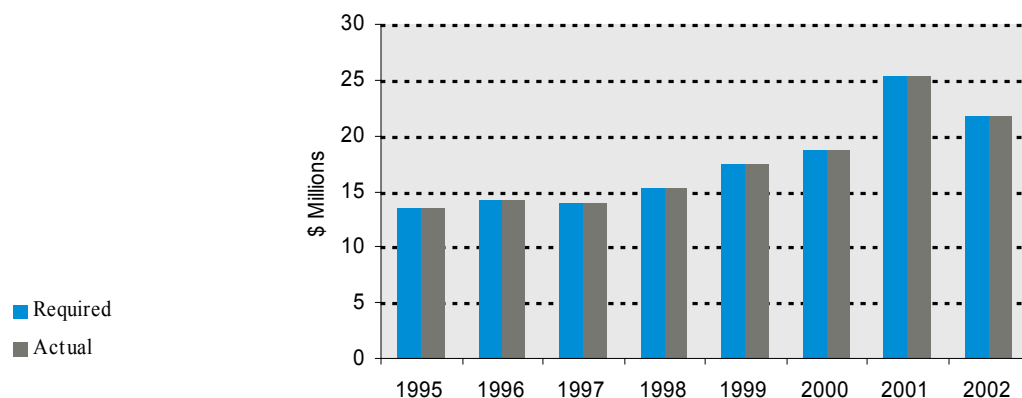
The other critical piece of information regarding the Plan's financial status is the funded ratio. This ratio compares the assets of the plan to the liabilities of the plan as calculated under GASB. High ratios indicate a well-funded plan with assets sufficient to pay most benefits. Lower ratios may indicate recent changes to benefit structures, funding of the plan below actuarial requirements, poor asset performance, or a variety of other changes.

The details regarding the calculations of these values and other GASB numbers may be found in Section 4, Exhibits II, III, and IV.

*These graphs show key GASB factors.*

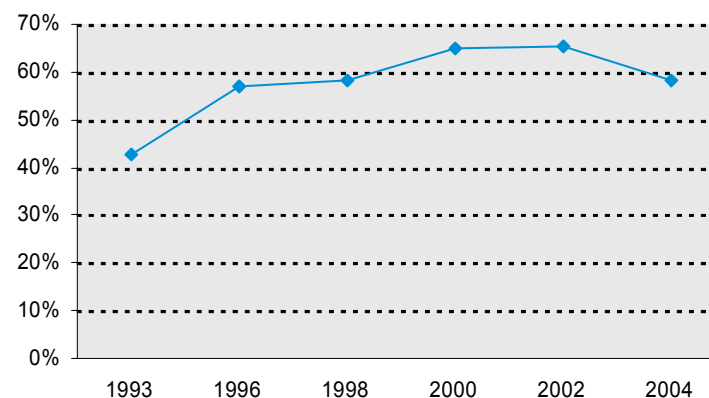
**CHART 15**

**Required Versus Actual Contributions**



**CHART 16**

**Funded Ratio**



### SECTION 3: Supplemental Information for the Barnstable County Retirement System

#### EXHIBIT A

#### Table of Plan Coverage

	Year Ended December 31		Change From Prior Year
Category	2003	2001	
Active participants in valuation			
Number	5,031	4,970	1.2%
Average age	45.5	45.1	N/A
Average service	8.7	8.5	N/A
Total payroll	\$181,849,453	\$166,134,511	9.5%
Average payroll	36,146	33,427	8.1%
Account balances	125,461,714	110,285,584	13.8%
Number with unknown age and/or service information	25	2	N/A
Inactive participants with a vested right to a return of their contributions or a deferred or immediate benefit			
	834	899	-7.2%
Retired participants			
Number in pay status	1,592	1,435	10.9%
Average age	71.7	72.4	N/A
Average monthly benefit	\$1,163	\$954	21.9%
Disabled participants:			
Number in pay status	275	258	6.6%
Average age	59.6	58.5	N/A
Average monthly benefit	\$1,780	\$1,664	7.0%
Number in suspended status	0	1	-100.0%
Beneficiaries in pay status	258	259	-0.4%

### SECTION 3: Supplemental Information for the Barnstable County Retirement System

#### EXHIBIT B

#### Participants in Active Service as of December 31, 2003 By Age, Years of Service, and Average Payroll

Age	Years of Service										Unknown
	Total	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & over	
Under 25	114	110	--	--	--	--	--	--	--	--	4
	\$26,373	\$26,275	--	--	--	--	--	--	--	--	\$29,061
25 - 29	279	246	30	--	--	--	--	--	--	--	3
	\$32,437	\$31,935	\$37,349	--	--	--	--	--	--	--	\$24,490
30 - 34	497	305	160	29	2	--	--	--	--	--	1
	\$36,935	\$33,548	\$42,066	\$42,865	\$59,408	--	--	--	--	--	\$31,741
35 - 39	645	295	142	112	93	2	--	--	--	--	1
	\$39,307	\$31,916	\$42,808	\$47,082	\$48,062	\$43,553	--	--	--	--	\$29,354
40 - 44	789	319	176	122	130	39	2	--	--	--	1
	\$37,187	\$27,784	\$37,892	\$44,250	\$47,071	\$54,891	\$56,549	--	--	--	\$36,713
45 - 49	917	335	212	126	123	73	46	1	--	--	1
	\$36,557	\$27,762	\$33,671	\$38,704	\$46,212	\$52,260	\$56,802	\$48,572	--	--	\$47,403
50 - 54	808	270	175	102	105	61	56	39	--	--	--
	\$37,184	\$28,207	\$32,759	\$38,176	\$43,621	\$51,913	\$55,535	\$49,861	--	--	--
55 - 59	540	167	112	98	67	37	31	20	6	--	2
	\$35,963	\$28,737	\$34,530	\$37,500	\$33,560	\$44,862	\$47,755	\$62,255	\$68,060	--	\$17,928
60 - 64	308	95	61	41	47	26	24	9	3	1	1
	\$33,717	\$28,153	\$32,557	\$37,382	\$39,008	\$40,304	\$31,422	\$38,307	\$41,025	\$54,346	\$34,143
65 - 69	80	12	24	13	13	5	5	4	2	2	--
	\$27,255	\$23,141	\$24,479	\$20,610	\$31,721	\$30,269	\$37,364	\$39,477	\$38,193	\$31,245	--
70 & over	43	9	9	7	10	2	2	2	--	1	1
	\$25,698	\$14,770	\$19,786	\$34,463	\$29,903	\$41,070	\$18,173	\$42,105	--	\$16,769	\$34,258
Unknown	11	1	--	--	--	--	--	--	--	--	10
	\$7,749	\$24,376	--	--	--	--	--	--	--	--	\$6,086
Total	5,031	2,164	1,101	650	590	245	166	75	11	4	25
	\$36,146	\$29,613	\$36,411	\$40,619	\$43,670	\$49,595	\$49,962	\$51,002	\$55,256	\$33,402	\$20,002

**SECTION 3: Supplemental Information for the Barnstable County Retirement System**

**EXHIBIT C**

**Summary Statement of Income and Expenses**

	<b>Year Ended December 31, 2003</b>	<b>Year Ended December 31, 2002</b>
<b>Contribution income:</b>		
Employer contributions	\$25,561,567	\$15,545,341
Employee contributions	16,407,178	16,241,497
Federal grant reimbursement contributions	116,269	63,541
Less administrative expenses	<u>-626,414</u>	<u>-623,022</u>
Net contribution income	\$41,458,600	\$31,227,357
<b>Investment income</b>	<u>24,466,937</u>	<u>-24,583,451</u>
<b>Total income available for benefits</b>	\$65,925,537	\$6,643,906
<b>Less benefit payments:</b>		
Pensions and annuities	\$28,620,253	\$24,746,606
Net 3(8)(c) reimbursements	-281,820	-285,753
Refunds to members	<u>2,349,172</u>	<u>2,015,582</u>
Net benefit payments	\$30,687,605	\$26,476,435
<b>Change in reserve for future benefits</b>	\$35,237,932	-\$19,832,529

**SECTION 3: Supplemental Information for the Barnstable County Retirement System**

**EXHIBIT D**

**Development of the Fund Through December 31, 2003**

<b>Year Ended December 31</b>	<b>Employer Contributions</b>	<b>Employee Contributions</b>	<b>Other Contributions</b>	<b>Net Investment Return*</b>	<b>Administrative Expenses</b>	<b>Benefit Payments</b>	<b>Actuarial Value of Assets at End of Year</b>
1998	\$15,295,566	\$10,775,581	\$56,031	\$20,857,870	\$589,498	\$17,101,740	\$264,581,470
1999	17,448,995	12,006,583	46,617	26,183,190	567,839	19,302,305	300,396,711
2000	18,674,787	12,671,911	50,636	22,811,404	591,022	21,486,621	332,527,806
2001	25,399,346	13,850,025	69,141	15,615,391	607,973	23,941,840	362,911,896
2002	15,545,341	16,241,497	63,541	-24,583,451	623,022	26,476,435	343,079,367
2003	25,561,567	16,407,178	116,269	24,466,938	626,414	30,687,605	378,317,300

*\* Net of investment expenses*

**SECTION 3: Supplemental Information for the Barnstable County Retirement System**

**EXHIBIT E**

**Development of Unfunded Actuarial Accrued Liability and (Gain)/Loss**

	<b>Year Ended December 31, 2003</b>
1. Unfunded actuarial accrued liability as of January 1, 2002	\$190,620,070
2. Normal cost as of January 1, 2002 including administrative expenses	24,571,264
3. Interest for 2002: $.0825 \times [(1) + (2)]$	17,753,285
4. Total contributions with interest for 2002	33,478,477
5. Estimated unfunded actuarial accrued liability as of January 1, 2003: $(1) + (2) + (3) - (4)$	199,466,142
6. Estimated normal cost as of January 1, 2003	25,676,971
7. Interest for 2003: $.0825 \times [(5) + (6)]$	18,574,306
8. Total contributions with interest for 2003	44,337,781
9. Expected unfunded actuarial accrued liability as of January 1, 2004: $(5) + (6) + (7) - (8)$	199,379,638
10. Actual unfunded actuarial accrued liability as of January 1, 2004 before plan or assumption changes	269,338,111
11. (Gain)/loss for two-year period: $(10) - (9)$	69,958,473



**SECTION 3: Supplemental Information for the Barnstable County Retirement System**

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**EXHIBIT F**

**Table of Amortization Bases as of July 1, 2004**

Type*	Annual Payment*	Years Remaining	Outstanding Balance
1992 ERI liability	\$48,694	4.00	\$181,256
2002 ERI liability	409,350	24.00	6,614,121
2003 ERI liability	154,964	24.00	2,503,846
Remaining unfunded liability	<u>15,696,972</u>	24.00	<u>270,928,929</u>
Total	\$16,309,980		\$280,228,152

*\* Level percentage of payroll, including adjustment for timing.*

### SECTION 3: Supplemental Information for the Barnstable County Retirement System

#### EXHIBIT G

#### Funding Schedule

(1) Fiscal Year Ended June 30	(2) Employer Normal Cost	(3) Amortization of 1992 ERI Liability	(4) Amortization of 2002 ERI Liability	(5) Amortization of 2003 ERI Liability	(6) Amortization of Remaining Unfunded Liability	(7) Total Plan Cost: (2) + (3) + (4) + (5) + (6)	(8) Total Unfunded Accrued Liability
2005	\$11,473,083	\$48,694	\$409,350	\$154,964	\$15,696,972	\$27,783,063	\$280,228,152
2006	11,989,372	50,885	427,770	161,937	17,594,702	30,224,666	286,037,880
2007	12,528,894	53,175	447,020	169,224	18,386,464	31,584,777	290,283,655
2008	13,092,694	55,567	467,136	176,839	19,213,854	33,006,090	294,008,851
2009	13,681,865	-	488,157	184,797	20,078,478	34,433,297	297,131,331
2010	14,297,549	-	510,124	193,113	20,982,009	35,982,795	299,622,045
2011	14,940,939	-	533,080	201,803	21,926,200	37,602,022	301,327,225
2012	15,613,281	-	557,068	210,884	22,912,879	39,294,112	302,137,468
2013	16,315,879	-	582,137	220,374	23,943,958	41,062,348	301,932,340
2014	17,050,094	-	608,333	230,291	25,021,436	42,910,154	300,579,373
2015	17,817,348	-	635,708	240,654	26,147,401	44,841,111	297,932,979
2016	18,619,129	-	664,314	251,483	27,324,034	46,858,960	293,833,269
2017	19,456,990	-	694,209	262,800	28,553,616	48,967,615	288,104,769
2018	20,332,555	-	725,448	274,626	29,838,528	51,171,157	280,555,030
2019	21,247,520	-	758,093	286,984	31,181,262	53,473,859	270,973,110
2020	22,203,658	-	792,207	299,898	32,584,419	55,880,182	259,127,935
2021	23,202,823	-	827,857	313,394	34,050,718	58,394,792	244,766,512
2022	24,246,950	-	865,110	327,497	35,583,000	61,022,557	227,611,995
2023	25,338,063	-	904,040	342,234	37,184,235	63,768,572	207,361,582
2024	26,478,276	-	944,722	357,635	38,857,526	66,638,159	183,684,232
2025	27,669,798	-	987,235	373,728	40,606,114	69,636,875	156,218,189
2026	28,914,939	-	1,031,660	390,546	42,433,390	72,770,535	124,568,298
2027	30,216,111	-	1,078,085	408,120	44,342,892	76,045,208	88,303,086
2028	31,575,836	-	1,126,599	426,486	46,338,322	79,467,243	46,951,600

Notes: Amortization payments increase at 4.50% per year.

Recommended contributions are assumed to be paid on July 1 and December 31.

**SECTION 3: Supplemental Information for the Barnstable County Retirement System****EXHIBIT H****Unit Allocation of ERI Amortizations****Unit Allocation of ERI Amortizations**

<b>Unit</b>	<b>1992 ERI</b>	<b>2002 ERI</b>	<b>2003 ERI</b>
Barnstable County	--	\$148,545	\$21,645
Barnstable Fire	--	3,318	--
Barnstable Housing Authority	\$4,824	2,979	--
Bourne Recreation	4,933	13,111	--
Bourne Water	17,640	3,800	--
C.O.M.M. Fire	--	--	3,798
Cape Cod Mosquito	--	2,079	--
County Hospital	--	5,901	--
Dennis Housing	--	1,987	--
Hyannis Fire	7,840	1,311	--
Mashpee Water	--	--	3,306
Town of Barnstable	--	79,296	--
Town of Bourne	--	61,609	--
Town of Brewster	--	13,016	--
Town of Eastham	--	18,266	--
Town of Mashpee	4,394	29,154	--
Town of Nantucket	--	--	91,804
Town of Truro	9,063	10,643	--
Town of Wellfleet	--	11,148	--
Town of Yarmouth	--	--	31,212
Veterans District	--	3,187	--
Yarmouth Housing	--	--	3,199
Total Fiscal Year 2005 Payment	\$48,694	\$409,350	\$154,964

### SECTION 3: Supplemental Information for the Barnstable County Retirement System

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#### EXHIBIT I

#### Definitions of Pension Terms

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The following list defines certain technical terms for the convenience of the reader:

#### Assumptions or Actuarial

##### Assumptions:

The estimates on which the cost of the Plan is calculated including:

- (a) Investment return — the rate of investment yield that the Plan will earn over the long-term future;
- (b) Mortality rates — the death rates of employees and pensioners; life expectancy is based on these rates;
- (c) Retirement rates — the rate or probability of retirement at a given age;
- (d) Turnover rates — the rates at which employees of various ages are expected to leave employment for reasons other than death, disability, or retirement.

##### Normal Cost:

The amount of contributions required to fund the benefit allocated to the current year of service.

##### Actuarial Accrued Liability

##### For Actives:

The equivalent of the accumulated normal costs allocated to the years before the valuation date.

##### Actuarial Accrued Liability

##### For Pensioners:

The single sum value of lifetime benefits to existing pensioners. This sum takes account of life expectancies appropriate to the ages of the pensioners and the interest that the sum is expected to earn before it is entirely paid out in benefits.

##### Unfunded Actuarial Accrued Liability:

The extent to which the actuarial accrued liability of the Plan exceeds the assets of the Plan. There is a wide range of approaches to paying off the unfunded actuarial accrued liability, from meeting the interest accrual only to amortizing it over a specific period of time.

**SECTION 3: Supplemental Information for the Barnstable County Retirement System**

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**Amortization of the Unfunded**

**Actuarial Accrued Liability:** Payments made over a period of years equal in value to the Plan's unfunded actuarial accrued liability.

**Investment Return:**

The rate of earnings of the Plan from its investments, including interest, dividends and capital gain and loss adjustments, computed as a percentage of the average value of the fund. For actuarial purposes, the investment return often reflects a smoothing of the capital gains and losses to avoid significant swings in the value of assets from one year to the next.

## SECTION 4: Reporting Information for the Barnstable County Retirement System

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### EXHIBIT I

#### Summary of Actuarial Valuation Results

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The valuation was made with respect to the following data supplied to us:

1. Retired participants as of the valuation date (including 258 beneficiaries in pay status)	2,125
2. Participants active during the year ended December 31, 2003 with total accumulated contributions of \$125,461,714 and projected payroll of \$190,614,004	5,031
3. Inactive participants as of December 31, 2003 with a vested right to a return of their contributions or a deferred or immediate benefit	834

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The actuarial factors as of the valuation date are as follows:

1. Total normal cost	\$26,246,836
2. Administrative expenses	715,300
3. Expected employee contributions	<u>-15,959,037</u>
4. Employer normal cost: (1) + (2) + (3)	\$11,003,099
5. Actuarial accrued liability	647,655,411
Pensioners and beneficiaries	\$300,573,800
Active participants	340,446,734
Inactive participants	6,634,877
6. Actuarial value of assets (\$361,191,642 at market value)	378,317,300
7. Unfunded actuarial accrued liability	269,338,111

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The actuarial factors projected to July 1, 2004 are as follows:

1. Projected employer normal cost, adjusted for timing	\$11,473,083
2. Projected unfunded actuarial accrued liability	280,228,152
3. Payment on projected unfunded actuarial accrued liability, adjusted for timing	17,674,187
4. Preliminary recommended contribution: (1) + (3)	29,147,270
5. Budgeted appropriation	27,783,063
6. Projected payroll	194,855,625

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Notes: *Amortization payments increase at 4.50% per year.*  
*Recommended contributions are assumed to be paid on July 1 and December 31.*

**SECTION 4: Reporting Information for the Barnstable County Retirement System**

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**EXHIBIT II**

**Supplementary Information Required by the GASB – Schedule of Employer Contributions**

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<b>Plan Year Ended December 31</b>	<b>Annual Required Contributions</b>	<b>Actual Contributions</b>	<b>Percentage Contributed</b>
1995	\$13,432,100	\$13,432,100	100.0%
1996	14,104,900	14,104,900	100.0%
1997	13,988,800	13,988,800	100.0%
1998	15,295,400	15,295,400	100.0%
1999	17,448,700	17,448,700	100.0%
2000	18,674,787	18,674,787	100.0%
2001	25,399,346	25,399,346	100.0%
2002	15,545,341	15,545,341	100.0%
2003	25,561,567	25,561,567	100.0%

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**SECTION 4: Reporting Information for the Barnstable County Retirement System****EXHIBIT III****Supplementary Information Required by the GASB – Schedule of Funding Progress**

<b>Actuarial Valuation Date</b>	<b>Actuarial Value of Assets (a)</b>	<b>Actuarial Accrued Liability (AAL) (b)</b>	<b>Unfunded/ (Overfunded) AAL (UAAL) (b) - (a)</b>	<b>Funded Ratio (a) / (b)</b>	<b>Covered Payroll (c)</b>	<b>UAAL as a Percentage of Covered Payroll [(b) - (a) / (c)]</b>
01/01/1993	\$97,194,645	\$226,430,792	\$129,236,147	42.92%	\$97,074,725	133.13%
01/01/1996	157,044,089	276,107,221	119,063,132	56.88%	108,456,079	109.78%
01/01/1998	235,247,660	404,215,695	168,968,035	58.20%	121,161,677	139.46%
01/01/2000	300,396,700	462,462,500	162,065,800	64.96%	152,293,100	106.42%
01/01/2002	362,911,896	553,531,966	190,620,070	65.56%	173,610,557	109.80%
01/01/2004	378,317,300	647,655,411	269,338,111	58.41%	190,614,004	141.30%



**SECTION 4: Reporting Information for the Barnstable County Retirement System**

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**EXHIBIT IV**

**Supplementary Information Required by the GASB**

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<b>Valuation date</b>	January 1, 2004
<b>Actuarial cost method</b>	Entry Age Normal Cost Method
<b>Amortization method</b>	Payments increase at 4.50% per year
<b>Remaining amortization period</b>	4 years from July 1, 2004 for 1992 Early Retirement Incentive, 24 years from July 1, 2004 for 2002 and 2003 Early Retirement Incentives and remaining unfunded liability
<b>Asset valuation method</b>	5-year smoothing of investment returns greater (less) than expected
<b>Actuarial assumptions:</b>	
Investment rate of return	8.25%
Projected salary increases	5.00%
Cost of living adjustments	3.00% of first \$12,000 of retirement income

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**SECTION 4: Reporting Information for the Barnstable County Retirement System**

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**EXHIBIT V**

**Actuarial Assumptions and Actuarial Cost Method**

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**Mortality Rates:**

<i>Healthy:</i>	1994 Group Annuity Mortality Table
<i>Disabled:</i>	1994 Group Annuity Mortality Table with 5 year set forward

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**Termination Rates before Retirement:**

Age	Groups 1 and 2 - Rate (%)			
	Mortality		Disability	Withdrawal
	Male	Female		
20	0.05	0.03	0.06	7.94
25	0.07	0.03	0.09	7.72
30	0.08	0.04	0.11	7.22
35	0.09	0.05	0.18	6.28
40	0.11	0.07	0.24	5.15
45	0.16	0.10	0.43	3.98
50	0.26	0.14	0.61	2.56
55	0.44	0.23	0.92	0.94
60	0.80	0.44	1.23	0.09

*Notes: 50% of the disability rates shown represent accidental disability.  
20% of the accidental disabilities will die from the same cause as the disability.*

## SECTION 4: Reporting Information for the Barnstable County Retirement System

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Group 4 - Rate (%)				
Age	Mortality		Disability	Withdrawal
	Male	Female		
20	0.05	0.03	0.12	0.00
25	0.07	0.03	0.18	0.00
30	0.08	0.04	0.22	0.00
35	0.09	0.05	0.35	0.00
40	0.11	0.07	0.48	0.00
45	0.16	0.10	0.85	0.00
50	0.26	0.14	1.22	0.00
55	0.44	0.23	1.84	0.00
60	0.80	0.44	2.46	0.00

*Notes: 50% of the disability rates shown represent accidental disability.  
60% of the accidental disabilities will die from the same cause as the disability.*

<b>Retirement Ages:</b>	Groups 1 and 2: age 63 Group 4: age 58
<b>Unknown Data for Participants:</b>	Same as those exhibited by participants with similar known characteristics.
<b>Age of Spouse:</b>	Female (or male) spouses 3 years younger (or older) than their spouses.
<b>Percent Married:</b>	75%
<b>Net Investment Return:</b>	8.25%
<b>Salary Increases:</b>	5.00% for all future years
<b>Interest on Employee Contributions:</b>	3.5%
<b>Administrative Expenses:</b>	\$715,300 for calendar 2004.

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#### SECTION 4: Reporting Information for the Barnstable County Retirement System

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<b>Actuarial Value of Assets:</b>	A preliminary actuarial value is first determined by taking the actuarial value of assets at the beginning of the year and adding assumed investment earnings (at the assumed actuarial rate of return) and the net new money during the year (contributions less benefit payments and administrative expenses). Twenty percent of the difference between the market value of assets and the preliminary actuarial value of assets is added to the preliminary actuarial value. In order that the actuarial value not differ too significantly from the market value of assets, the final actuarial value of assets must be within 20% of the market value of assets.
<b>Actuarial Cost Method:</b>	Entry Age Normal Actuarial Cost Method. Entry Age is the age of the participant at Date of Hire. Normal Cost and Actuarial Accrued Liability are calculated on an individual basis and are allocated by salary.
<b>Changes in Assumptions:</b>	Based on past experience and future expectations, the salary increase assumption from 4.50 for the first year, 5.00% thereafter, to 5.00% for all future years.

## SECTION 4: Reporting Information for the Barnstable County Retirement System

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### EXHIBIT VI

#### Summary of Plan Provisions

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This exhibit summarizes the major provisions of Chapter 32 of the Laws of Massachusetts.

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<b>Plan Year:</b>	January 1 – December 31
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#### Retirement Benefits

Employees covered by the Contributory Retirement Law are classified into one of four groups depending on job classification. Group 1 comprises most positions in state and local government. It is the general category of public employees. Group 4 comprises mainly police and firefighters. Group 2 is for other specified hazardous occupations. (Officers and inspectors of the State Police are classified as Group 3.)

The annual amount of the retirement allowance is based on the member's final three-year average salary multiplied by the number of years and full months of creditable service at the time of retirement and multiplied by a percentage according to the following table based on the age of the member at retirement:

Age Last Birthday at Date of Retirement			
Percent	Group 1	Group 2	Group 4
2.5	65 or over	60 or over	55 or over
2.4	64	59	54
2.3	63	58	53
2.2	62	57	52
2.1	61	56	51
2.0	60	55	50
1.9	59	--	49
1.8	58	--	48
1.7	57	--	47
1.6	56	--	46
1.5	55	--	45

## SECTION 4: Reporting Information for the Barnstable County Retirement System

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A member's final three-year average salary is defined as the greater of the highest consecutive three-year average annual rate of regular compensation and the average annual rate of regular compensation received during the last three years of creditable service prior to retirement. The \$30,000 cap on salary used in a benefit determination for any employee hired after January 1, 1979 has been removed.

The maximum annual amount of the retirement allowance is 80 percent of the member's final three-year average salary. Any member who is a veteran also receives an additional yearly retirement allowance of fifteen dollars per year of creditable service, not exceeding three hundred dollars. The veteran allowance is paid in addition to the 80 percent maximum.

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### Employee Contributions

Employees hired before January 1, 1975 contribute 5 percent of their salary; employees hired after December 31, 1974 and before January 1, 1984 contribute 7 percent; employees hired after January 1, 1984 contribute 8 percent; employees hired after July 1, 1996 contribute 9 percent. In addition, employees hired after December 31, 1978 contribute an additional 2 percent of salary in excess of \$30,000.

Employees hired after 1983 who leave with less than five years of credited service receive no interest on their contributions and employees who leave with five but less than ten years receive one-half the rate of regular interest otherwise payable.

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### Retirement Benefits (Superannuation)

Members of Group 1, 2 or 4 may retire upon the attainment of age 55. For retirement at ages below 55, twenty years of creditable service is required.

Members who terminate before age 55 with ten or more years of creditable service are eligible for a retirement allowance upon the attainment of age 55 (provided they have not withdrawn their accumulated deductions from the Annuity Savings Fund of the system).

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### Ordinary Disability Benefits

A member who is unable to perform his job due to a non-occupational disability will receive a retirement allowance if he has ten or more years of creditable service and has not reached age 55. The annual amount of such allowance shall be determined as if the member retired for superannuation at age 55, based on the amount of creditable

## **SECTION 4: Reporting Information for the Barnstable County Retirement System**

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service at the date of disability. For veterans, there is a minimum benefit of 50 percent of the member's most recent year's pay plus an annuity based on his own contributions.

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### **Accidental Disability Benefit**

For a job-connected disability the benefit is 72 percent of the member's most recent annual pay plus an annuity based on his own contributions, plus additional amounts for surviving children. Benefits are capped at 75 percent of annual rate of regular compensation for employees who become members after January 1, 1988.

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### **Death Benefits**

In general, the beneficiary of an employee who dies in active service will receive a refund of the employee's own contributions. Alternatively, if the employee were eligible to retire on the date of his death, a spouse's benefit will be paid the full amount the employee would have received under Option C (previously, two-thirds of the amount). The surviving spouse of a member who dies with two or more years of credited service has the option of a refund of the employee's contributions or a monthly benefit regardless of eligibility to retire, if they were married for at least one year. There is also a minimum widow's pension of \$500 per month, and there are additional amounts for surviving children.

If an employee's death is job-connected, the spouse will receive 72 percent of the member's most recent annual pay in addition to a refund of the member's accumulated deductions, plus additional amounts for surviving children.

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### **"Heart And Lung Law" And Cancer Presumption**

Any case of hypertension or heart disease resulting in total or partial disability or death to a uniformed fireman or permanent member of a police department is presumed to have been suffered in the line of duty, unless the contrary is shown by competent evidence. Any case of disease of the lungs or respiratory tract resulting in total disability or death to a uniformed fireman is presumed to have been suffered in the line of duty, unless the contrary is shown by competent evidence. There is an additional presumption for uniformed firemen that certain types of cancer are job-related if onset occurs while actively employed or within five years of retirement.

#### SECTION 4: Reporting Information for the Barnstable County Retirement System

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##### Options

Members may elect to receive a full retirement allowance payable for life under Option A. Under Option B a member may elect to receive a lower monthly allowance in exchange for a guarantee that at his death any of his contributions not expended for annuity payments will be refunded to his beneficiary. Option C allows the member to take a lesser retirement allowance in exchange for providing his survivor with two-thirds of the lesser amount. Option C pensioners who retire in 1988 or later will have their benefits converted from a reduced to a full retirement if the beneficiary predeceases the retiree.

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##### Post-Retirement Benefits

The Board has adopted the provisions of Section 51 Chapter 127 of the Acts of 1999, which provide that the Retirement Board may approve an annual COLA in excess of the Consumer Price Index but not to exceed a 3% COLA on the first \$12,000 of a retirement allowance. Cost-of-living increases granted prior to July 1, 1998 are reimbursed by the Commonwealth and not reflected in this report.

##### Changes in Plan Provisions:

There have been no changes in plan provisions since the last valuation.